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TRANSLATOR'S DECLARATION

I, Walter F. Fasse, having an office at: 58G Main Road North,
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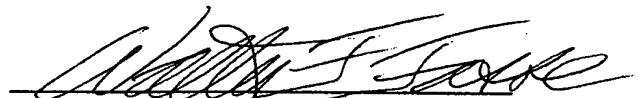
that I am fully conversant and knowledgeable in the German
language to fluently read, write, and speak it, I am also fully
conversant and knowledgeable in the English language;

that I have, to the best of my ability, prepared the attached
accurate, complete and literal translation of the German text of:

U. S. PROVISIONAL APPLICATION 60/413,029 AS FILED ON
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I further declare that all statements made herein of my own
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Date: September 16, 2003


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LITERAL TRANSLATION OF THE GERMAN TEXT OF U. S. PROVISIONAL
APPLICATION 60/413,029 AS FILED ON SEPTEMBER 23, 2002

Method and Apparatus for Transmitting Speech Signals By Means of an Aircraft Speech Transmission Device

The invention relates to a method as well as an apparatus for
transmission of speech signals by means of an aircraft speech
5 transmission arrangement.

Aircraft speech receiving or recording apparatuses are typically
used in communication systems in the area of the aircraft cabin
and of the cockpit for the communication between the flight
attendants and/or the pilots or for announcements to the
10 passengers. Speaking arrangements in the form of handsets, hand
microphones, or microphones as a component of a headset are used.
In that context, the quality of the speech signal to be
transmitted depends on several factors, which the speaker can
more or less independently influence, so that a qualitatively
15 "good" speech signal is to be perceived over the transmission
distance at the hearer. The individual speech characteristics
of each respective speaker similarly have an influence on the
quality of the speech information to be transmitted, as well as
the interfering noises out of the surrounding environment of the
20 speaker, and the technological realization of the speech
processing, handling or working. Moreover, the holding of the
handset by the speaker is situation dependent and the optimal
handling cannot be guaranteed with general applicability, because
each user individually and subjectively evaluates his handling.

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Thus, the quality of the speech signal to be transmitted fluctuates in connection with different holding of the handset or microphone by the speaker, in connection with possibly present interfering noises, as well as dependent on the volume and the pronunciation of the speech signal.

Thus, it is the underlying object of the present invention to provide a method as well as an apparatus, which, in a simple and cost-economical manner, indicates the quality of the speech to be transmitted, and therewith makes it possible for the speaker to improve the speech reception or recording. Therewith, the communication especially within an aircraft cabin is to be improved.

This object is achieved according to the invention by the measures recited in the patent claim 1.

In that context, according to patent claim 1, it is especially advantageous, that the speech quality of the speech signal is detectable for the speaker, and thus indicators are returned or reported back, which induce him to alter factors that are influenceable by him. Thus, on the one hand, the position of the speech receiving or recording apparatus can be altered, or the volume and clarity of his pronunciation is to be improved.

An apparatus for the carrying out of the method is recited in the patent claim 7.

Further developments and advantageous embodiments are recited in the dependent claims, claims 2 to 6 and 8 to 10. Details and further advantages arise from the following description of an example embodiment of the invention.

5 In the drawing, an example embodiment of the invention is illustrated, which is described in further detail below in connection with the Figs. 1 and 2. It is shown by:

Fig. 1 a schematic illustration of an aircraft speech transmission arrangement; and

10 Fig. 2 an inventive apparatus for speech analysis as well as for improvement of the speech quality.

An aircraft speech transmission arrangement 1 is schematically shown in the Fig. 1. The speech signal 3 generated by a speaker 2 is directed in the direction of an aircraft speech receiving or recording apparatus 4. In the illustrated embodiment, the
15 speech receiving apparatus 4 is embodied as a handset with installed microphone 13. As further speech receiving apparatuses 4, for example hand microphones or also microphones of a headset come into consideration. The quality of the speech signal 3 to
20 be transmitted depends on several factors, which are more or less influenceable by the speaker. The individual speech characteristics of each respective speaker, such as the volume of the speech signal and the clarity of the pronunciation, have an influence on the quality of the speech information to be

transmitted, just as do interfering noises 5 out of the surrounding environment of the speaker 2 as well as a differing holding of the speech receiving apparatus 4 by the speaker 2. A transmission path or distance from the speaker 2 (larynx of the speaker) through the air to the speech receiving apparatus 4 is fixed or determined by the holding of the speech receiving apparatus 4 in a certain position. This transmission path is determined on the one hand by the spacing distance r between larynx (speaker 2) and speech receiving apparatus 4, and on the other hand by the angle α between the speaking direction and the receiving part of the speech receiving apparatus 4. In order to achieve an improved speech quality, it is the aim of the invention, to optimize the transmission path from the speaker 2 to the speech receiving apparatus 4 (larynx-air-microphone). This aim is to be achieved by a detection of the speech signal, an evaluation of the speech quality, as well as a return acknowledgment of indicators, which induce or prompt the speaker to alter the position of the speech receiving apparatus 4 (primarily spacing distance r and angle α), or to improve the volume and/or the "clarity" of his pronunciation, so that an improvement of the speech quality is achieved. Such an apparatus 7 (see Fig. 2) for speech analysis and evaluation of the speech quality is provided as a component of the speech receiving apparatus 4, which receives the speech informations 3 by means of microphone 13. If the speech signal 8 has a sufficient quality, either no acknowledgment response information or an acknowledgment response information 9 to be interpreted as positive is provided to the speaker 2. The output apparatus 11,

that is to say a loudspeaker, outputs the speech signal via a speech processing system 6 to one or more hearers 12. In case the speech quality of the signal 8 is "capable of improvement", or not adequate, acknowledgment response informations 9 are given to the speaker 2, who, in connection with the signaling 10, recognizes that an improvement potential exists in the speech quality, so that he can alter the position of the speech receiving apparatus 4 or improve his pronunciation. Also in this case, the speech signals are provided via the speech processing system 6 and the output apparatus 11 to one or more hearers 12.

In the following Fig. 2, the regulating or control method for increasing the speech quality as well as the apparatus 7 for speech analysis and evaluation of the speech quality is explained in detail. It is provided, to carry out an optimization of the interface larynx (speaker 2) - microphone 4 during the actual speech. The speech information 8 is processed in the apparatus 7 for the speech analysis and for the evaluation of the speech quality, preferably in a programmable processing and computing unit. For the processing, analog and/or digital converted parameters are detected or acquired out of the speech information 8, compared with quality-indicative reference parameters 14, and thus evaluated, so that a result is generated, which evaluates the speech quality SQ of the speech information 8. As parameters there should, for example, be named: SNR (signal to noise ratio), height or magnitude of the signal level, or constancy of the signal level. Dependent on the achieved result of the speech quality, the further progress of the regulation method is

determined. If the speech quality is capable of improvement, an acknowledgment response information 9 is triggered or released by the processing and computing unit 7, which information 9 is perceived by the speaker 2 via signal means 10, and on his part
5 an optimization of the positioning of the speech receiving apparatus 4 can be carried out, whereby the spacing distance r or the angle α can be altered, or the volume and/or the clarity of the pronunciation can be improved by him. The acknowledgment response signal of the acknowledgment response information 9 is
10 provided as an optical, acoustic, or mechanical signal means, or in a combination of the various different types of signal means. For example, an indicator unit, which is integrated in the speech receiving apparatus 4, can indicate or refer to an "improvable" speech quality possibly with a blinking indicator or an indicator
15 on a display. Alternatively or in combination, acoustic signals (loudspeakers) or also a vibration signal can be utilized, whereby the selection of a signal means can be carried out according to the requirements, and among other things, the form or configuration of the speech receiving apparatus 4 is to be
20 considered in the selection of the response acknowledgment signal that is to be used.

In a further embodiment of the invention it is possible that the speech quality determined during a speaking process is provided permanently as acknowledgment response information 9 during the
25 entire speech. This embodiment is realizable, for example, in that one selects a green indication for a good and sufficient speech quality of the speech signal 3, and provides a red,

possibly blinking, indication for an "improvable" speech quality of the speech signal 3. The indication should be well perceivable by the speaker 2, for example being in the immediate field of view of the speaker or being integrated in the speech receiving apparatus 4. Also a short signal tone in the handset would be an information possibility as the acknowledgment response information 9 for the speaker 2. With such an embodiment, a functional monitoring of the speech transmission is simultaneously ensured. Thus, with the indication of an acknowledgment response signal (independent of the representation of the speech quality), it is recognizable for the speaker, that the speech receiving apparatus 4 as well as the speech processing module 7 are functioning.

Reference Number List

- 1 - aircraft speech transmission arrangement
- 2 - speaker
- 3 - speech signal (not yet converted)
- 5 3a - recovered speech signal
- 4 - aircraft speech receiving apparatus
- 5 - interfering noises
- 6 - speech processing system
- 7 - apparatus for speech analysis and speech evaluation
- 10 (speech processing module)
- 8 - speech information in digital/analog form
- 8a - speech information in digital/analog form
- 9 - acknowledgment response information
- 10 - signal means
- 15 11 - output device (e.g. loudspeaker)
- 12 - hearer
- 13 - microphone
- 14 - reference parameter

Patent Claims

1. Method for the transmission of speech signals by means of an aircraft speech transmission arrangement, characterized in that the speech signal (3) is detected by a speech receiving apparatus (4), the speech quality is analyzed in an apparatus for the speech analysis and speech evaluation (7) and is compared with reference parameters (14), a measure for the speech quality (SQ) is allocated to the speech signal (8), whereby, upon not reaching a sufficient speech quality (SQ), acknowledgment response informations (9) are generated, which represent the speech quality (SQ) in the area of perception of a speaker (2).
2. Method according to claim 1, characterized in that the speech signal (8) is provided to an output device (11).
3. Method according to one of the claims 1 or 2, characterized in that, among others, the following parameters are detected or encompassed by the speech signal (8): SNR (signal to noise ratio), magnitude of the signal level and/or constancy of the signal level.
4. Method according to one of the claims 1 to 3, characterized in that optical, acoustic or mechanical signal means (10) are used for acknowledgment response informations (9).

5. Method according to claim 4, characterized in that a combination of various different signal means (10) is used.
6. Method according to one of the claims 1 to 5, characterized in that the acknowledgment response information (9) is permanently generated and indicated, whereby in connection with sufficient speech quality this is indicated, and in connection with insufficient speech quality corresponding indication or instruction signals are indicated.
7. Apparatus for the carrying out of the method according to one of the claims 1 to 6, characterized in that an aircraft speech transmission arrangement (1) comprises a speech receiving apparatus (4) including microphone (13) and at least one output unit (11), whereby the speech receiving apparatus (4) includes an apparatus for speech analysis and speech evaluation (7), which generates acknowledgment response informations (9), which are visible by means of signal means (10) in the perception area of the speaker (2).
8. Apparatus according to claim 7, characterized in that the apparatus for the speech analysis and speech evaluation (7) is embodied as a preferably programmable processing and computing unit with corresponding processing software.
9. Apparatus according to one of the claims 7 or 8, characterized in that an indicator (or display) unit, a

vibration element or a loudspeaker unit is provided as signal means (10).

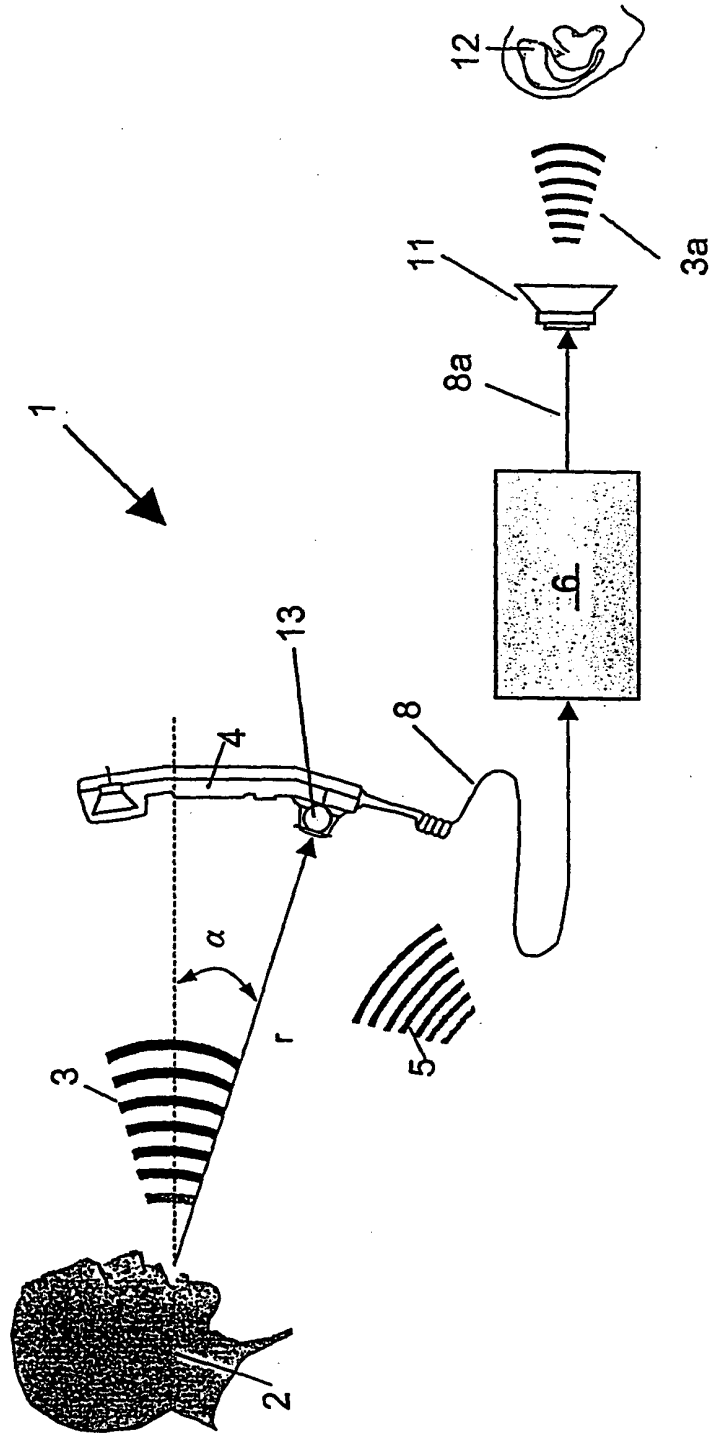
10. Apparatus according to claim 9, characterized in that a combination of the signal means (10) is provided.

Abstract

A method as well as an apparatus for the transmission of speech signals by means of an aircraft speech transmission arrangement is suggested. The speech signal is detected by a speech
5 receiving apparatus, and in an apparatus for the speech analysis and speech evaluation, the speech quality is analyzed and compared with reference parameters. A measure for the speech quality is allocated to the speech signal, whereby in connection with not reaching a sufficient speech quality, acknowledgment
10 response informations are generated, which represent the speech quality in the perception area of a speaker. The invention offers the advantage, that the speech quality of the speech signal is detectable for the speaker, and therewith indicators are provided back or returned, to prompt him to alter factors
15 that are influenceable by him. Thus, on the one hand, the position of the speech receiving apparatus can be altered, or the speaker can improve the volume and clarity of his pronunciation.

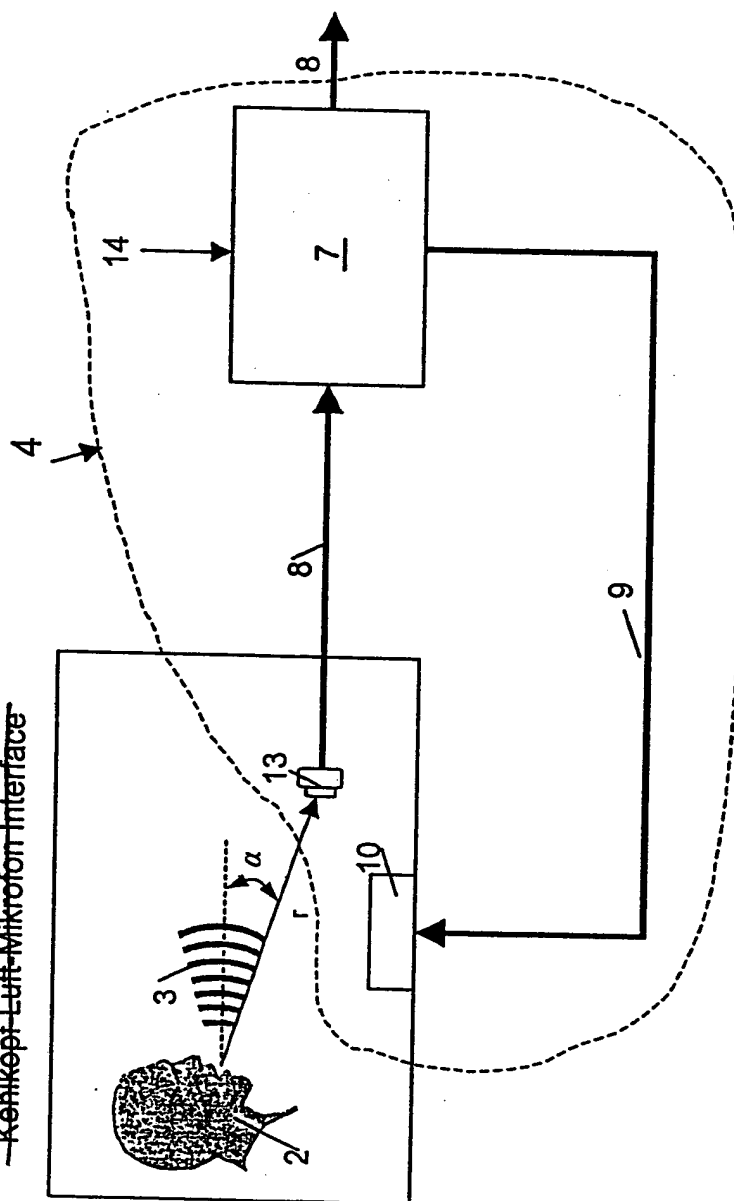
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Fig. 1



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Fig. 2
 LARVIX - AIR-MICROPHONE INTERFACE
 - Kehlkopf-Luft-Mikrofon-Interface



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